

REMARKS

The pending Office Action addresses claims 1-30, however claims 21-30 are withdrawn from consideration. Remaining claims 1-20 stand rejected.

Amendments to the Claims

Applicant cancels withdrawn claims 21-30. Applicants reserve the right to pursue this claims in a divisional application.

Rejections Pursuant to 35 U.S.C. §103

Pierce and Dong

The Examiner rejects claims 13-14 and 19-20 pursuant to 35 U.S.C. §103(a) as being obvious over WO 01/43850 to Pierce in view of U.S. Patent No. 6,291,552 to Dong. The Examiner argues that Pierce discloses a filter media that includes chopped wool glass fibers having a diameter in the range of about 0.1 to 5.0 microns, and that may be made using a wet laid process. The Examiner admits, however, that Pierce fails to mention varying the pH of the nonwoven glass layer during the wet laid process. Thus, the Examiner relies on Dong to disclose adding oppositely charged viscosity modifiers to the glass fibers resulting in a pH in the range of about 5 to about 10, thereby obtaining a filter media that *inherently* has the claimed gamma value. Applicants respectfully disagree.

The Examiner argues that Dong teaches adjusting the pH of a slurry during the wet-laid process. This is incorrect. Dong merely states that charged viscosity modifiers can be added to the slurry to adjust the polarity of the fibers. Dong does not teach that the viscosity modifiers adjust the pH in any way. Dong also merely states that the pH of the slurry ranges from about 5 to about 10, more preferably from about 7 to about 8.5. There is no teaching or suggestion that the viscosity modifiers are used to obtain such a pH. The fact that the slurry has a pH between 5 and 10 also does not mean that the pH is *adjusted*. The claimed Gamma value recited in claim 13 is obtained by forming a slurry having an acidic pH, and then *adjusting* the pH to a neutral or alkaline pH. The pH disclosed by Dong is merely the pH of the slurry. Dong does not suggest that the pH is ever adjusted. Accordingly, Dong fails to remedy the deficiencies of Pierce, and thus the combination of

references does not teach a filter media that inherently has the claimed gamma value.

It also would also not have been obvious to a person having ordinary skill in the art at the time of the invention to modify Pierce in view of Dong. Pierce discloses a filter media that is formed from chopped glass fibers and glass wool fibers that are substantially free of boron to allow the filter media to be used in clean room environments, which require a high resistance to humidity. Dong, on the other hand, is directed to a wet-laid glass mat for use as a reinforcing element for roofing shingles, flooring, wall coverings, etc. Dong does not teach or even suggest using the glass fiber mat as a filter. No person having ordinary skill in the art would rely on a reference directed to a reinforcement paper used in shingles, flooring, and wall coverings to modify a filter media used in a clean room environment for filtering air.

Dong is also non-analogous. A reference is "analogous" if (1) the reference is within the field of the inventor's endeavor, and if it is not, then (2) the reference must be reasonably pertinent to the particular problem with which the inventor was involved. MPEP 2141.01(a). The present invention is directed to nonwoven filters that can be used in battery separates, air and water filters, vacuum bags, air conditioning, etc. that have high filtration efficiencies. Dong is not directed to any type of filter, but rather is directed to a reinforcement material, as discussed above. Dong is thus not concerned with providing high filtration efficiencies. Accordingly, Dong is not within the field of the inventor's endeavor, and it is not reasonably pertinent to the problem to be solved.

Claims 13-14 and 19-20 therefore distinguish over Pierce and Dong and present allowable subject matter.

Pierce, Dong, & Head or Yamaguchi

The Examiner also rejects dependent claims 16 and 17 as being obvious over Pierce and Dong, and further in view of U.S. Patent No. 4,102,785 to Head et al., and claim 18 as being obvious over Pierce, Dong, and U.S. Patent No. 6,749,753 of Yamaguchi et al. Claims 16, 17, and 18 are allowable at least because they depend from claim 13 which, as discussed above, distinguishes over Pierce and Dong. Head does not remedy the deficiencies of Pierce and Dong, as Head is merely relied on to teach the claimed fiber density. Yamaguchi likewise does not remedy the deficiencies of

Pierce and Dong as Yamaguchi is merely relied on to teach the claimed fiber diameter.

Pierce, Dong, and Perez

The Examiner also rejects claims 1-17 and 19-20 pursuant to 35 U.S.C. §103(a) as being obvious over Pierce in view of Dong, and further in view of U.S. Patent No. 6,420,024 of Perez et al. The Examiner relies on Perez to teach that it is known in the filtration art to use a surface area of greater than $0.25 \text{ m}^2/\text{gm}$. While applicants do not agree that it would have been obvious to modify the surface area of Pierce and Dong in view of Perez, even if the references could be combined they still fail to teach the claimed invention. As discussed above, neither Pierce nor Dong teaches or even suggest a filter media that inherently has the claimed gamma value. Claims 1-17 and 19-20 therefore distinguish over Pierce, Dong, and Perez and represent allowable subject matter.

Applicants further note that the surface area cannot merely be modified to have a specific value, as suggested by the Examiner. It has to be obtained. The applicants set out to provide a filter media having a high filtration efficiency, and thus having certain properties such as an increased surface area. They successfully developed a process that produced the desired results. The surface area was not pre-selected or merely set as desired, as suggested by the Examiner.

Pierce, Dong, Perez, and Yamaguchi

The Examiner also rejects dependent claim 18 as being obvious over Pierce and Dong, and further in view of Yamaguchi. Again, claim 18 is allowable at least because it depends from claim 13 which, as discussed above, distinguishes over Pierce and Dong. Yamaguchi does not remedy the deficiencies of Pierce and Dong as Yamaguchi is merely relied on to teach the claimed fiber diameter.

Pierce and Pall

The Examiner also rejects claims 13-14 and 19-20 pursuant to 35 U.S.C. §103(a) as being obvious over WO 01/43850 to Pierce in view of U.S. Patent No. 4,523,995 to Pall. Like Dong, like Examiner relies on Pall to disclose varying the pH of the nonwoven glass layer during the wet laid process to a pH in the range of about 7 to about 10, thereby obtaining a filter media that inherently

has the claimed gamma value. Applicants disagree. A person having ordinary skill would have no motivation to modify Pierce in view of Pall.

Pall is directed to a filter media that is formed by preparing a slurry containing glass fibers, and adding a binder resin to the slurry *before* forming a fiber mat. In order to coat the fibers with the binder resin, a precipitating agent must be added to the slurry to precipitate the binder resin. Pall also states that the pH of the slurry can be adjusted to an alkaline value during formation of the resin-coated glass fibers. This is done to obtain the highest precipitation efficiency since the “precipitating efficiency is a function of pH.” (Col. 7, line 59.) Once the binder resin is precipitated, the resin-coated fibers are then formed into a fiber mat.

Pierce is directed to an entirely distinct process. The filter media of Pierce is formed using a standard wet laid or dry laid process. In particular, the chopped glass fibers and glass wool fibers are combined to form a slurry, and the fibers are then collected on a filter screen to form a fiber mat. *After* the fiber mat is formed, a binder can be added to the mat to coat the fibers. Since Pierce does not add the binder to the slurry, there is no reason to adjust the pH of the slurry, as taught by Pall and suggested by the Examiner. As explained above, the pH adjusting agent is merely added to the slurry of Pall to facilitate precipitation of the binder resin onto the fibers. Pierce does not precipitate a binder onto the fibers, much less add a binder to the slurry. The binder is only added after the fiber mat is formed, thus there is no need to adjust the pH of the slurry.

Accordingly, there is no motivation to rely on the teachings of Pall to modify Pierce. Claims 13-14 and 19-20 therefore distinguish over Pierce and Pall and represent allowable subject matter.

The Examiner also rejects various claims over Pierce and Pall in combination with Head, Yamaguchi, and/or Perez. For the same reasons previously discussed with respect to Pierce and Dong, Head, Yamaguchi, and Perez do not remedy the deficiencies of Pierce and Pall. Applicants also note with respect to Perez that the surface area cannot merely be modified to have a specific value, as suggested by the Examiner. It has to be obtained. The applicants set out to provide a filter media having a high filtration efficiency, and thus having certain properties such as an increased surface area. They successfully developed a process that produced the desired results. In particular,

Applicants discovered that adjusting the pH of the slurry prior to formation of the fiber mat will help retain sub-micron sized particles, thereby increasing the surface area of the resulting fiber mat. The surface area was not pre-selected or merely set as desired, as suggested by the Examiner.

Conclusion

In conclusion, Applicant submits that all claims are now in condition for allowance, and allowance thereof is respectfully requested. The Examiner is encouraged to telephone the undersigned attorney for Applicant if such communication is deemed to expedite prosecution of this application.

Respectfully submitted,

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